1 - ブロモブタンのラットを用いた
吸入による13週間毒性試験報告書

試験番号：0503

TABLES

TABLES

TABLE 1 SURVIVAL ANIMAL NUMBERS AND BODY WEIGHT CHANGES OF MALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Week on Study	Control		63 ppm			125 ppm			250 ppm			500 ppm			1000 ppm		
	Av. Wt.	No. of Surviv.	Av. Wt.	% of cont.	No. of Surviv.	Av. Wt.	% of cont.	No. of Surviv.	Av. Wt.	% of cont.	No. of Surviv.	Av. Wt.	% of cont.	No. of Surviv.	Av. Wt.	% of cont.	No. of Surviv.
	<10>		<10>			<10>			<10>			<10>			<10>		
0	123 (10)	10 / 10	123 (10)	100	10 / 10	123 (10)	100	10 / 10	123 (10)	100	10 / 10	123 (10)	100	10 / 10	123 (10)	100	10 / 10
1	149 (10)	10 / 10	149 (10)	100	10 / 10	148 (10)	99	10 / 10	146 (10)	98	10 / 10	141 (10)	95	10 / 10	136 (10)	91	10 / 10
2	177 (10)	10 / 10	180 (10)	102	10 / 10	178 (10)	101	10 / 10	174 (10)	98	10 / 10	166 (10)	94	10 / 10	159 (10)	90	10 / 10
3	200 (10)	10 / 10	203 (10)	102	10 / 10	201 (10)	101	10 / 10	197 (10)	99	10 / 10	185 (10)	93	10 / 10	174 (10)	87	10 / 10
4	220 (10)	10 / 10	222 (10)	101	10 / 10	221 (10)	100	10 / 10	215 (10)	98	10 / 10	201 (10)	91	10 / 10	185 (10)	84	10 / 10
5	236 (10)	10 / 10	238 (10)	101	10 / 10	236 (10)	100	10 / 10	233 (10)	99	10 / 10	217 (10)	92	10 / 10	198 (10)	84	10 / 10
6	249 (10)	10 / 10	253 (10)	102	10 / 10	251 (10)	101	10 / 10	247 (10)	99	10 / 10	229 (10)	92	10 / 10	206 (10)	83	10 / 10
7	263 (10)	10 / 10	265 (10)	101	10 / 10	263 (10)	100	10 / 10	259 (10)	98	10 / 10	240 (10)	91	10 / 10	211 (10)	80	10 / 10
8	272 (10)	10 / 10	278 (10)	102	10 / 10	274 (10)	101	10 / 10	271 (10)	100	10 / 10	249 (10)	92	10 / 10	220 (10)	81	10 / 10
9	283 (10)	10 / 10	287 (10)	101	10 / 10	283 (10)	100	10 / 10	280 (10)	99	10 / 10	258 (10)	91	10 / 10	223 (10)	79	10 / 10
10	292 (10)	10 / 10	296 (10)	101	10 / 10	292 (10)	100	10 / 10	287 (10)	98	10 / 10	264 (10)	90	10 / 10	223 (10)	76	10 / 10
11	300 (10)	10 / 10	302 (10)	101	10 / 10	298 (10)	99	10 / 10	293 (10)	98	10 / 10	269 (10)	90	10 / 10	228 (10)	76	10 / 10
12	304 (10)	10 / 10	308 (10)	101	10 / 10	303 (10)	100	10 / 10	299 (10)	98	10 / 10	274 (10)	90	10 / 10	230 (10)	76	10 / 10
13	309 (10)	10 / 10	312 (10)	101	10 / 10	308 (10)	100	10 / 10	303 (10)	98	10 / 10	277 (10)	90	10 / 10	229 (10)	74	10 / 10

< > : No. of effective animals, ( ) : No. of measured animals, Av. Wt. : Averaged body weight (Unit : g).

TABLE 2 SURVIVAL ANIMAL NUMBERS AND BODY WEIGHT CHANGES OF FEMALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Week on Study	Control		63 ppm			125 ppm			250 ppm			500 ppm			1000 ppm		
	Av. Wt. <10>	No. of Surviv.	Av. Wt. <10>	% of cont.	No. of Surviv.	Av. Wt. <10>	% of cont.	No. of Surviv.	Av. Wt. <10>	% of cont.	No. of Surviv.	Av. Wt. <10>	% of cont.	No. of Surviv.	Av. Wt. <10>	% of cont.	No. of Surviv.
0	95 (10)	10 / 10	95 (10)	100	10 / 10	95 (10)	100	10 / 10	95 (10)	100	10 / 10	95 (10)	100	10 / 10	95 (10)	100	10 / 10
1	106 (10)	10 / 10	106 (10)	100	10 / 10	107 (10)	101	10 / 10	106 (10)	100	10 / 10	105 (10)	99	10 / 10	103 (10)	97	10 / 10
2	118 (10)	10 / 10	120 (10)	102	10 / 10	120 (10)	102	10 / 10	119 (10)	101	10 / 10	116 (10)	98	10 / 10	116 (10)	98	10 / 10
3	127 (10)	10 / 10	129 (10)	102	10 / 10	129 (10)	102	10 / 10	128 (10)	101	10 / 10	125 (10)	98	10 / 10	122 (10)	96	10 / 10
4	134 (10)	10 / 10	136 (10)	101	10 / 10	137 (10)	102	10 / 10	135 (10)	101	10 / 10	131 (10)	98	10 / 10	127 (10)	95	10 / 10
5	142 (10)	10 / 10	143 (10)	101	10 / 10	144 (10)	101	10 / 10	141 (10)	99	10 / 10	136 (10)	96	10 / 10	132 (10)	93	10 / 10
6	148 (10)	10 / 10	148 (10)	100	10 / 10	149 (10)	101	10 / 10	148 (10)	100	10 / 10	144 (10)	97	10 / 10	135 (10)	91	10 / 10
7	151 (10)	10 / 10	153 (10)	101	10 / 10	154 (10)	102	10 / 10	153 (10)	101	10 / 10	146 (10)	97	10 / 10	138 (10)	91	10 / 10
8	153 (10)	10 / 10	159 (10)	104	10 / 10	156 (10)	102	10 / 10	157 (10)	103	10 / 10	151 (10)	99	10 / 10	141 (10)	92	10 / 10
9	158 (10)	10 / 10	161 (10)	102	10 / 10	162 (10)	103	10 / 10	161 (10)	102	10 / 10	155 (10)	98	10 / 10	144 (10)	91	10 / 10
10	162 (10)	10 / 10	166 (10)	102	10 / 10	169 (10)	104	10 / 10	165 (10)	102	10 / 10	156 (10)	96	10 / 10	147 (10)	91	10 / 10
11	166 (10)	10 / 10	169 (10)	102	10 / 10	170 (10)	102	10 / 10	168 (10)	101	10 / 10	162 (10)	98	10 / 10	148 (10)	89	10 / 10
12	169 (10)	10 / 10	172 (10)	102	10 / 10	174 (10)	103	10 / 10	171 (10)	101	10 / 10	162 (10)	96	10 / 10	148 (10)	88	10 / 10
13	171 (10)	10 / 10	175 (10)	102	10 / 10	176 (10)	103	10 / 10	173 (10)	101	10 / 10	165 (10)	96	10 / 10	145 (10)	85	10 / 10

< > : No. of effective animals, ( ) : No. of measured animals, Av. Wt. : Averaged body weight (Unit : g).

TABLE 3 FOOD CONSUMPTION CHANGES OF MALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Week on Study	Control		63 ppm			125 ppm			250 ppm			500 ppm			1000 ppm		
	Av. FC.	No. of Surviv. <10>	Av. FC.	% of cont.	No. of Surviv. <10>	Av. FC.	% of cont.	No. of Surviv. <10>	Av. FC.	% of cont.	No. of Surviv. <10>	Av. FC.	% of cont.	No. of Surviv. <10>	Av. FC.	% of cont.	No. of Surviv. <10>
1	14.5 (10)	10 / 10	13.7 (10)	94	10 / 10	13.5 (10)	93	10 / 10	13.2 (10)	91	10 / 10	11.9 (10)	82	10 / 10	11.6 (10)	80	10 / 10
2	15.2 (10)	10 / 10	15.9 (10)	105	10 / 10	15.4 (10)	101	10 / 10	15.2 (10)	100	10 / 10	14.6 (10)	96	10 / 10	14.1 (10)	93	10 / 10
3	16.2 (10)	10 / 10	16.6 (10)	102	10 / 10	16.2 (10)	100	10 / 10	16.3 (10)	101	10 / 10	15.8 (10)	98	10 / 10	15.5 (10)	96	10 / 10
4	16.1 (10)	10 / 10	16.9 (10)	105	10 / 10	16.9 (10)	105	10 / 10	16.9 (10)	105	10 / 10	16.5 (10)	102	10 / 10	15.7 (10)	98	10 / 10
5	16.3 (10)	10 / 10	17.2 (10)	106	10 / 10	16.5 (10)	101	10 / 10	17.6 (10)	108	10 / 10	17.3 (10)	106	10 / 10	16.3 (10)	100	10 / 10
6	15.8 (10)	10 / 10	16.6 (10)	105	10 / 10	15.9 (10)	101	10 / 10	16.9 (10)	107	10 / 10	16.9 (10)	107	10 / 10	16.6 (10)	105	10 / 10
7	15.5 (10)	10 / 10	16.3 (10)	105	10 / 10	16.1 (10)	104	10 / 10	17.1 (10)	110	10 / 10	17.1 (10)	110	10 / 10	16.5 (10)	106	10 / 10
8	16.0 (10)	10 / 10	16.7 (10)	104	10 / 10	16.6 (10)	104	10 / 10	17.2 (10)	108	10 / 10	17.2 (10)	108	10 / 10	15.9 (10)	99	10 / 10
9	16.0 (10)	10 / 10	17.0 (10)	106	10 / 10	16.7 (10)	104	10 / 10	17.7 (10)	111	10 / 10	17.4 (10)	109	10 / 10	16.8 (10)	105	10 / 10
10	15.8 (10)	10 / 10	16.9 (10)	107	10 / 10	16.4 (10)	104	10 / 10	17.0 (10)	108	10 / 10	16.7 (10)	106	10 / 10	16.5 (10)	104	10 / 10
11	15.6 (10)	10 / 10	16.1 (10)	103	10 / 10	16.0 (10)	103	10 / 10	16.6 (10)	106	10 / 10	16.8 (10)	108	10 / 10	16.1 (10)	103	10 / 10
12	15.5 (10)	10 / 10	16.6 (10)	107	10 / 10	16.1 (10)	104	10 / 10	16.5 (10)	106	10 / 10	16.7 (10)	108	10 / 10	17.3 (10)	112	10 / 10
13	15.3 (10)	10 / 10	16.3 (10)	107	10 / 10	15.7 (10)	103	10 / 10	16.5 (10)	108	10 / 10	16.7 (10)	109	10 / 10	16.9 (10)	110	10 / 10

< > : No. of effective animals, ( ) : No. of measured animals, Av. FC. : Averaged food consumption (Unit : g).

(Study No. 0503)

TABLE 4 FOOD CONSUMPTION CHANGES OF FEMALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Week on Study	Control		63 ppm			125 ppm			250 ppm			500 ppm			1000 ppm		
	Av. FC. <10>	No. of Surviv.	Av. FC. <10>	% of cont.	No. of Surviv.	Av. FC. <10>	% of cont.	No. of Surviv.	Av. FC. <10>	% of cont.	No. of Surviv.	Av. FC. <10>	% of cont.	No. of Surviv.	Av. FC. <10>	% of cont.	No. of Surviv.
1	10.2 (10)	10 / 10	10.0 (10)	98	10 / 10	10.1 (10)	99	10 / 10	9.5 (10)	93	10 / 10	9.5 (10)	93	10 / 10	9.4 (10)	92	10 / 10
2	10.3 (10)	10 / 10	10.8 (10)	105	10 / 10	10.7 (10)	104	10 / 10	10.9 (10)	106	10 / 10	11.2 (10)	109	10 / 10	11.0 (10)	107	10 / 10
3	10.5 (10)	10 / 10	10.6 (10)	101	10 / 10	11.1 (10)	106	10 / 10	11.1 (10)	106	10 / 10	11.4 (10)	109	10 / 10	11.3 (10)	108	10 / 10
4	10.2 (10)	10 / 10	10.6 (10)	104	10 / 10	11.4 (10)	112	10 / 10	11.4 (10)	112	10 / 10	11.8 (10)	116	10 / 10	11.6 (10)	114	10 / 10
5	10.6 (10)	10 / 10	10.7 (10)	101	10 / 10	10.9 (10)	103	10 / 10	11.5 (10)	108	10 / 10	12.0 (10)	113	10 / 10	11.9 (10)	112	10 / 10
6	10.0 (10)	10 / 10	10.5 (10)	105	10 / 10	10.7 (10)	107	10 / 10	11.5 (10)	115	10 / 10	11.5 (10)	115	10 / 10	12.4 (10)	124	10 / 10
7	9.8 (10)	10 / 10	10.4 (10)	106	10 / 10	10.4 (10)	106	10 / 10	11.7 (10)	119	10 / 10	11.8 (10)	120	10 / 10	12.5 (10)	128	10 / 10
8	9.7 (10)	10 / 10	10.5 (10)	108	10 / 10	10.4 (10)	107	10 / 10	11.5 (10)	119	10 / 10	11.7 (10)	121	10 / 10	12.4 (10)	128	10 / 10
9	10.4 (10)	10 / 10	10.4 (10)	100	10 / 10	10.8 (10)	104	10 / 10	11.9 (10)	114	10 / 10	11.9 (10)	114	10 / 10	12.8 (10)	123	10 / 10
10	9.7 (10)	10 / 10	10.5 (10)	108	10 / 10	10.9 (10)	112	10 / 10	11.5 (10)	119	10 / 10	11.6 (10)	120	10 / 10	12.7 (10)	131	10 / 10
11	10.2 (10)	10 / 10	10.5 (10)	103	10 / 10	10.3 (10)	101	10 / 10	11.7 (10)	115	10 / 10	11.8 (10)	116	10 / 10	12.2 (10)	120	10 / 10
12	10.1 (10)	10 / 10	10.6 (10)	105	10 / 10	11.1 (10)	110	10 / 10	11.8 (10)	117	10 / 10	11.8 (10)	117	10 / 10	13.0 (10)	129	10 / 10
13	9.8 (10)	10 / 10	10.6 (10)	108	10 / 10	10.5 (10)	107	10 / 10	11.7 (10)	119	10 / 10	12.1 (10)	123	10 / 10	12.5 (10)	128	10 / 10

< > : No. of effective animals, ( ) : No. of measured animals, Av. FC. : Averaged food consumption (Unit : g).

TABLE 5 HEMATOLOGY OF MALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Group Name	Control	63 ppm	125 ppm	250 ppm	500 ppm	1000 ppm
No. of examined animals	10	10	10	10	10	10
RED BLOOD CELL ($10^6/\mu$ L)	9.47 ± 0.22	9.51 ± 0.29	9.56 ± 0.26	9.52 ± 0.15	9.47 ± 0.21	9.04 ± 0.24 **
HEMOGLOBIN (g/dL)	16.0 ± 0.2	15.8 ± 0.3	16.0 ± 0.4	15.9 ± 0.3	16.0 ± 0.3	15.5 ± 0.3 **
MCV (fL)	47.7 ± 0.4	47.2 ± 0.2 *	47.3 ± 0.4	47.3 ± 0.4	47.8 ± 0.4	49.5 ± 0.6 **
MCH (pg)	16.9 ± 0.3	16.7 ± 0.3	16.8 ± 0.2	16.7 ± 0.3	16.9 ± 0.3	17.2 ± 0.2 *
MCHC (g/dL)	35.4 ± 0.5	35.3 ± 0.5	35.4 ± 0.3	35.3 ± 0.6	35.4 ± 0.4	34.7 ± 0.4 **
PLATELET ($10^3/\mu$ L)	714 ± 77	747 ± 71	750 ± 58	782 ± 42 *	825 ± 48 **	884 ± 27 **
RETICULOCYTE (%)	1.8 ± 0.2	1.9 ± 0.2	1.9 ± 0.2	2.1 ± 0.2 *	2.2 ± 0.3 **	3.2 ± 0.2 **

Mean ± S.D.

*) Significant difference, $p<0.05$ (Test of Dunnett)

**) Significant difference, $p<0.01$ (Test of Dunnett)

TABLE 6 HEMATOLOGY OF FEMALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Group Name	Control	63 ppm	125 ppm	250 ppm	500 ppm	1000 ppm
No. of examined animals	10	10	10	10	10	10
RED BLOOD CELL ($10^6/\mu$ L)	8.80 ± 0.19	8.85 ± 0.31	8.87 ± 0.21	8.95 ± 0.16	8.80 ± 0.19	8.50 ± 0.19 *
HEMOGLOBIN (g/dL)	16.1 ± 0.3	16.1 ± 0.4	16.1 ± 0.4	16.3 ± 0.2	16.2 ± 0.3	15.6 ± 0.5 *
MCV (fL)	50.4 ± 0.3	50.3 ± 0.3	50.3 ± 0.5	50.4 ± 0.3	50.8 ± 0.3 *	52.2 ± 0.3 **
MCHC (g/dL)	36.3 ± 0.4	36.2 ± 0.6	36.2 ± 0.6	36.0 ± 0.4	36.2 ± 0.4	35.2 ± 0.6 **
PLATELET ($10^3/\mu$ L)	778 ± 51	760 ± 42	802 ± 44	820 ± 38	868 ± 45 **	867 ± 36 **
RETICULOCYTE (%)	1.8 ± 0.2	1.8 ± 0.2	1.9 ± 0.3	2.2 ± 0.2	2.8 ± 0.2 **	3.1 ± 0.5 **
PROTHROMBIN TIME (sec)	12.2 ± 0.5	11.9 ± 0.7	12.4 ± 0.4	12.6 ± 0.8	12.8 ± 0.4	13.2 ± 0.9 *

Mean ± S.D.

*) Significant difference, $p<0.05$ (Test of Dunnett)

**) Significant difference, $p<0.01$ (Test of Dunnett)

TABLE 7 BIOCHEMISTRY OF MALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Group Name	Control	63 ppm	125 ppm		250 ppm		500 ppm		1000 ppm	
No. of examined animals	10	10	10		10		10		10	
TOTAL PROTEIN (g/dL)	6.5 ± 0.1	6.6 ± 0.1	6.7 ± 0.1	*	6.9 ± 0.2	**	6.9 ± 0.1	**	7.3 ± 0.2	**
ALBUMIN (g/dL)	3.5 ± 0.1	3.5 ± 0.1	3.6 ± 0.1		3.6 ± 0.1		3.7 ± 0.1	**	4.0 ± 0.1	**
T-BILIRUBIN (mg/dL)	0.11 ± 0.01	0.11 ± 0.01	0.11 ± 0.01		0.11 ± 0.01		0.11 ± 0.01		0.12 ± 0.01	*
TRIGLYCERIDE (mg/dL)	58 ± 16	42 ± 12	54 ± 21		42 ± 14	*	41 ± 8	*	29 ± 10	**
SODIUM (mEq/L)	142 ± 1	142 ± 1	142 ± 1		142 ± 1		140 ± 1	**	139 ± 1	**
CHLORIDE (mEq/L)	103 ± 1	104 ± 1	105 ± 1		105 ± 2		105 ± 1		106 ± 1	**
CALCIUM (mg/dL)	10.4 ± 0.2	10.3 ± 0.3	10.4 ± 0.1		10.5 ± 0.2		10.6 ± 0.2	**	10.9 ± 0.2	**

Mean ± S.D.

*) Significant difference, $p<0.05$ (Test of Dunnett)

**) Significant difference, $p<0.01$ (Test of Dunnett)

TABLE 8 BIOCHEMISTRY OF FEMALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Group Name	Control	63 ppm	125 ppm		250 ppm		500 ppm		1000 ppm	
No. of examined animals	10	10	10		10		10		10	
TOTAL PROTEIN (g/dL)	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2		6.2 ± 0.2		6.3 ± 0.2		6.8 ± 0.1	**
ALBUMIN (g/dL)	3.4 ± 0.1	3.3 ± 0.1	3.3 ± 0.1		3.3 ± 0.1		3.4 ± 0.1		3.7 ± 0.1	**
T-BILIRUBIN (mg/dL)	0.12 ± 0.01	0.13 ± 0.01	0.14 ± 0.02	**	0.13 ± 0.01		0.13 ± 0.01		0.14 ± 0.02	**
G-GTP(IU/L)	1 ± 1	2 ± 0	2 ± 1		2 ± 1		2 ± 1		4 ± 1	**
SODIUM (mEq/L)	140 ± 1	140 ± 1	140 ± 1		140 ± 1		139 ± 1	**	137 ± 1	**
CHLORIDE (mEq/L)	105 ± 2	105 ± 1	106 ± 1		107 ± 2	*	106 ± 1		108 ± 2	**
CALCIUM (mg/dL)	9.8 ± 0.2	9.8 ± 0.2	9.9 ± 0.2		10.0 ± 0.1		10.2 ± 0.2	**	10.4 ± 0.2	**

Mean ± S.D.

*) Significant difference, $p<0.05$ (Test of Dunnett)

**) Significant difference, $p<0.01$ (Test of Dunnett)

TABLE 9 ORGAN WEIGHTS OF MALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Group Name	Control	63 ppm	125 ppm	250 ppm	500 ppm	1000 ppm
No. of examined animal	10	10	10	10	10	10
Body weight (g)	288 ± 13	291 ± 14	287 ± 14	280 ± 7	255 ± 8 **	209 ± 10 **
Thymus (g)	0.255 ± 0.037	0.264 ± 0.031	0.262 ± 0.020	0.265 ± 0.030	0.229 ± 0.027	0.180 ± 0.023 **
Thymus (%)	0.089 ± 0.012	0.091 ± 0.011	0.091 ± 0.007	0.095 ± 0.011	0.090 ± 0.011	0.086 ± 0.009
Adrenals (g)	0.053 ± 0.004	0.052 ± 0.005	0.052 ± 0.005	0.049 ± 0.003	0.048 ± 0.003	0.049 ± 0.006
Adrenals (%)	0.019 ± 0.002	0.018 ± 0.002	0.018 ± 0.001	0.017 ± 0.001	0.019 ± 0.001	0.023 ± 0.003 **
Testes (g)	3.044 ± 0.137	3.109 ± 0.246	3.067 ± 0.081	3.031 ± 0.122	3.030 ± 0.113	2.694 ± 0.106 **
Testes (%)	1.059 ± 0.032	1.069 ± 0.066	1.071 ± 0.048	1.082 ± 0.040	1.187 ± 0.043 **	1.289 ± 0.059 **
Heart (g)	0.929 ± 0.064	0.961 ± 0.031	0.946 ± 0.051	0.943 ± 0.036	0.894 ± 0.051	0.841 ± 0.058 **
Heart (%)	0.323 ± 0.017	0.331 ± 0.010	0.330 ± 0.018	0.337 ± 0.011	0.350 ± 0.017 **	0.402 ± 0.016 **
Lungs (g)	0.946 ± 0.036	0.969 ± 0.040	0.972 ± 0.022	0.986 ± 0.050	0.959 ± 0.033	0.893 ± 0.047 *
Lungs (%)	0.329 ± 0.011	0.333 ± 0.011	0.340 ± 0.014	0.352 ± 0.015 **	0.376 ± 0.010 **	0.427 ± 0.019 **
Kidneys (g)	1.783 ± 0.103	1.843 ± 0.105	1.853 ± 0.079	1.869 ± 0.072	1.867 ± 0.074	1.755 ± 0.089
Kidneys (%)	0.620 ± 0.017	0.634 ± 0.012	0.647 ± 0.029 *	0.667 ± 0.019 **	0.731 ± 0.016 **	0.839 ± 0.020 **
Spleen (g)	0.534 ± 0.040	0.537 ± 0.035	0.538 ± 0.035	0.534 ± 0.028	0.510 ± 0.023	0.431 ± 0.033 **
Spleen (%)	0.186 ± 0.010	0.184 ± 0.008	0.188 ± 0.008	0.191 ± 0.011	0.200 ± 0.006 **	0.206 ± 0.007 **
Liver (g)	7.185 ± 0.339	7.671 ± 0.491 *	7.798 ± 0.436 **	7.904 ± 0.290 **	7.938 ± 0.276 **	7.605 ± 0.475
Liver (%)	2.498 ± 0.048	2.635 ± 0.057	2.720 ± 0.073	2.819 ± 0.057 **	3.109 ± 0.094 **	3.633 ± 0.126 **
Brain (g)	1.861 ± 0.035	1.902 ± 0.043	1.879 ± 0.056	1.879 ± 0.038	1.841 ± 0.049	1.692 ± 0.033 **
Brain (%)	0.648 ± 0.024	0.655 ± 0.024	0.656 ± 0.028	0.671 ± 0.019	0.721 ± 0.021 **	0.810 ± 0.035 **

Mean ± S.D.

*) Significant difference, $p<0.05$ (Test of Dunnett)

**) Significant difference, $p<0.01$ (Test of Dunnett)

TABLE 10 ORGAN WEIGHTS OF FEMALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE

Group Name	Control	63 ppm	125 ppm	250 ppm	500 ppm	1000 ppm
No. of examined animal	10	10	10	10	10	10
Body weight (g)	157 ± 10	160 ± 7	161 ± 9	157 ± 6	151 ± 5	132 ± 8 **
Thymus (g)	0.212 ± 0.025	0.210 ± 0.021	0.214 ± 0.023	0.198 ± 0.036	0.188 ± 0.013	0.156 ± 0.033 **
Thymus (%)	0.135 ± 0.013	0.131 ± 0.011	0.133 ± 0.015	0.126 ± 0.020	0.125 ± 0.012	0.118 ± 0.022
Adrenals (g)	0.053 ± 0.003	0.058 ± 0.006	0.058 ± 0.005	0.058 ± 0.005	0.058 ± 0.005	0.064 ± 0.011
Adrenals (%)	0.034 ± 0.002	0.036 ± 0.004	0.036 ± 0.004	0.037 ± 0.003	0.038 ± 0.003 *	0.049 ± 0.009 **
Heart (g)	0.596 ± 0.048	0.605 ± 0.041	0.620 ± 0.036	0.630 ± 0.029	0.635 ± 0.033	0.638 ± 0.040
Heart (%)	0.378 ± 0.019	0.379 ± 0.019	0.387 ± 0.020	0.401 ± 0.009	0.421 ± 0.022 **	0.486 ± 0.025 **
Lungs (g)	0.694 ± 0.039	0.738 ± 0.054	0.712 ± 0.042	0.730 ± 0.028	0.716 ± 0.033	0.686 ± 0.024
Lungs (%)	0.442 ± 0.018	0.462 ± 0.027	0.444 ± 0.018	0.465 ± 0.016	0.474 ± 0.016 **	0.522 ± 0.024 **
Kidneys (g)	1.090 ± 0.071	1.106 ± 0.058	1.112 ± 0.051	1.144 ± 0.049	1.166 ± 0.036 *	1.205 ± 0.058 **
Kidneys (%)	0.693 ± 0.033	0.693 ± 0.014	0.693 ± 0.017	0.728 ± 0.031	0.772 ± 0.026 **	0.917 ± 0.053 **
Spleen (g)	0.348 ± 0.021	0.354 ± 0.021	0.371 ± 0.023	0.370 ± 0.022	0.369 ± 0.023	0.310 ± 0.032 **
Spleen (%)	0.221 ± 0.008	0.222 ± 0.008	0.231 ± 0.006	0.235 ± 0.013 *	0.244 ± 0.016 **	0.235 ± 0.014
Liver (g)	3.794 ± 0.266	4.018 ± 0.277	4.027 ± 0.284	4.193 ± 0.176 **	4.468 ± 0.165 **	4.878 ± 0.322 **
Liver (%)	2.410 ± 0.066	2.517 ± 0.115 *	2.509 ± 0.090	2.668 ± 0.070 **	2.957 ± 0.054 **	3.707 ± 0.123 **
Brain (g)	1.747 ± 0.034	1.732 ± 0.034	1.721 ± 0.041	1.713 ± 0.040	1.690 ± 0.040 **	1.550 ± 0.039 **
Brain (%)	1.114 ± 0.065	1.087 ± 0.046	1.075 ± 0.051	1.091 ± 0.037	1.119 ± 0.031	1.181 ± 0.069 *

Mean ± S.D.

*) Significant difference, $p<0.05$ (Test of Dunnett)

**) Significant difference, $p<0.01$ (Test of Dunnett)

TABLE 11 INCIDENCES OF SELECTED LESIONS OF MALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE (SACRIFICED ANIMALS)

Group Name	Control				63 ppm				125 ppm				250 ppm				500 ppm				1000 ppm			
No. of Animals on Study	10				10				10				10				10				10			
Grade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Nasal cavity	<10>				<10>				<10>				<10>				<10>				<10>			
disarrangement:olfactory epithelium	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	6	0	0	0 *	6	0	0	0 *
respiratory metaplasia:olfactory epithelium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0
atrophy:olfactory epithelium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0 *
Stomach	<10>				<10>				<10>				<10>				<10>				<10>			
hyperplasia:forestomach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	1	0	0
Testis	<10>				<10>				<10>				<10>				<10>				<10>			
mineralization	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
germ cell necrosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0 **
Brain	<10>				<10>				<10>				<10>				<10>				<10>			
degeneration:granular cell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
mineralization:granular layer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0

Grade 1 : Slight 2 : Moderate 3 : Marked 4 : Severe
< > : Number of animals examined at the site
Significant difference ; * : $p < 0.05$ ** : $p < 0.01$ Test of Chi Square

TABLE 12 INCIDENCES OF SELECTED LESIONS OF FEMALE RATS IN THE 13-WEEK INHALATION STUDY OF 1-BROMOBUTANE (SACRIFICED ANIMALS)

Group Name	Control				63 ppm				125 ppm				250 ppm				500 ppm				1000 ppm				
No. of Animals on Study	10				10				10				10				10				10				
Grade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Nasal cavity	<10>				<10>				<10>				<10>				<10>				<10>				
disarrangement:olfactory epithelium	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	8	0	0	0	**
respiratory metaplasia:olfactory epithelium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
atrophy:olfactory epithelium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	
Thymus	<10>				<10>				<10>				<10>				<10>				<10>				
atrophy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Stomach	<10>				<10>				<10>				<10>				<10>				<10>				
erosion:forestomach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
hyperplasia:forestomach	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	
Brain	<10>				<10>				<10>				<10>				<10>				<10>				
degeneration:granular cell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	*
mineralization:granular layer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	

Grade 1 : Slight 2 : Moderate 3 : Marked 4 : Severe
< > : Number of animals examined at the site
Significant difference ; * : $p < 0.05$ ** : $p < 0.01$ Test of Chi Square